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APPLIED CHEMISTRY.

(1) *Coal-tar Dyes and Intermediates.* By E. de Barry Barnett. (Industrial Chemistry Series.) Pp. xviii+213. (London: Baillière, Tindall, and Cox, 1919.) Price 10*s.* 6*d.* net.

(2) *Coal-tar and some of its Products.* By Arthur R. Warnes. (Pitman's Common Commodities and Industries.) Pp. xxii+105. (London: Sir I. Pitman and Sons, Ltd., n.d.) Price 2*s.* 6*d.* net.

(3) *Van Nostrand's Chemical Annual.* Fourth issue, 1918. Thoroughly revised and enlarged. Edited by Prof. John C. Olsen. Assistant editor, M. P. Matthias. Pp. xviii+778. (London: Constable and Co., Ltd., 1918.) Price 15*s.* net.

(1) THIS volume, by Mr. E. de B. Barnett, is one of the series of works on industrial chemistry now being published under the editorship of Dr. Samuel Rideal. The series aims at giving a comprehensive survey of the present condition of the chemical industries, the various subjects being treated from the chemical rather than from the engineering point of view. The books appeal mainly to the advanced student, whose mind, in the opinion of the editor, "is often crammed with the hard facts and details of his subject which crowd out the power of realising the industry as a whole," and who, "on commencing his industrial career, is positively handicapped by his academic knowledge because of his lack of information on current industrial conditions." There is, no doubt, room for difference of opinion as to the best course of instruction to be pursued in the case of one who is being prepared for a career in applied science, and it may be that the change from the purely academic side to that of application has hitherto been too abrupt, and that something in the nature of an intermediate course on the principles of technology is desirable. This fact, indeed, is now generally recognised, and we have the evidence for it in the creation of such places as the Imperial College at South Kensington, and in the extension of the newer universities, such as Manchester, Liverpool, Leeds, and Birmingham, all of which have largely developed their technological side, either by the establishment of new chairs or, as in the cases of Manchester and Glasgow, by uniting themselves with schools of technology already existing. Conditions arising out of the war will no doubt accelerate this movement, not only in this country, but also throughout the British Dominions. As we know, it has given an enormous impetus to technical education in America and in Japan, and bids fair to jeopardise the industrial future of Germany, at least in the chemical arts. Whatever the future may have in store for our defeated enemy, there can be no doubt whatever that her supremacy in certain branches of manufacturing chemistry is irretrievably gone.

The book under review appears, therefore, at an opportune time, and it is one of many similar productions which aim at rousing British chemical manufacturers to a sense of their present opportunity. It deals with an industry which took its rise in this country, but was in large measure lost to us through a variety of causes, not the least of which was our deplorable educational system and the supine inactivity of public opinion which failed to insist upon its betterment. We are, however, quickly changing all that, and we may confidently hope that the coming generation will see a marked improvement. The manufacture of the so-called coal-tar dyes has already received a great extension in this country, and is rapidly assuming the position of a staple industry. It is bound to pass through many a critical phase in the near future, but the conjoint efforts of our schools of instruction, with wise management on the part of our producers, together with the benevolent attitude of Parliament, will, we trust, serve to steer it safely through its difficulties. This country will never again have such an opportunity to recover its lost position in this industry, and it would now be the height of unwisdom for it to neglect its chance.

The book before us, of course, makes no pretension to be a complete treatise on the subject with which it deals. It can scarcely be expected that a volume of some 200 pages would adequately cover so vast a field. It gives, however, a fairly satisfactory *aperçu* of the various processes involved in the manufacture of what are known as "intermediates"—that is, of compounds employed in the manufacture of actual dyestuffs, such as nitration, amidation, sulphonation, hydroxylation, etc.—and describes the mode of production and uses of the more important of these substances and of their main chemical and physical properties. This constitutes part i. of the book, and is made up of five sections, extending in all to some eighty-three pages. It is naturally highly condensed, and no attempt is made to illustrate it by any figures of the plant in actual use, which we consider an unfortunate omission. Drawings of plant, such as an engineer would make, do more to present what the editor calls "the reality of the living industry" than whole pages of verbal description.

Part ii., which constitutes the bulk of the work, is divided into fourteen sections, each dealing with a special group of dyestuffs. These sections are naturally of very unequal length, such groups as the azo-dyes, the triphenylmethane dyes, the azines, the indigoid dyestuffs, and the anthraquinone dyes—among the more important of the synthetic dyes—extending over several pages, whilst the nitroso- and nitro-dyes, the indamines and indophenols, oxazines, thiazines, quinolines, acridines, and sulphide dyes are somewhat summarily dismissed. A valuable

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feature of the book is its bibliography and its summary of patent literature, which may render it of use to the works chemist. The main drawback is, of course, that such summaries in so progressive a subject rapidly become out of date.

The book concludes with a short statement concerning the possible future of a synthetic dyestuff industry in Great Britain. Here the author is on debatable ground, and certain of his views may be open to criticism. Indeed, he concedes that the question whether such an industry can be established here on a paying basis admits of a considerable difference of opinion. The high cost of transport has in the past been a severe handicap, and there can be no doubt that the railway companies have done little to promote the interests of the manufacturers; it remains to be seen, however, whether nationalisation and the re-opening of inland waterways and coasting harbours will effect the desired improvement. The author pleads for at least temporary protection to the "key" industries, and especially to the dyestuff industry, which has in effect been promised by the Government. He naturally welcomes the financial assistance by loans and grants-in-aid already made by the State for capital cost of plant and depreciation and specialised technical research, but he sees many difficulties in complying with the conditions imposed by the Board of Trade, and in his opinion the success of the whole scheme of bureaucratic administration is very questionable. He thinks a better scheme would be to establish a central "Board of Chemical Industry" on the same lines as the U.S. Bureau of Chemistry, and he gives a sketch of its constitution and functions. As it is suggested that the proposed Board should be a Government department, it is not very obvious how it differs, or at least need differ, from the organisation already proposed, as the admitted aims and duties are identical. Much, of course, depends upon facilities for the manufacture of "intermediates," and it is suggested that benzol and toluol producers might themselves convert these products and sell them to the actual dye-makers, or that the coke-oven undertakings might take over their manufacture. This would, no doubt, be a great advantage from a purely economic point of view, and allow the smaller dye-makers to compete on better terms with the larger concerns, and so tend to diminish the chance of the monopoly which the present combine is not unlikely to bring about.

(2) This little book is a member of Pitman's series of Common Commodities and Industries. It attempts to explain within the limits of 100 crown octavo pages the main features of the origin and uses of coal-tar and of the methods employed to obtain commercially valuable materials from it. Although necessarily very slight in treatment, it possesses certain features of value which are lacking in the work just noticed. It is fairly well illustrated, and its descriptions of manufacturing processes are adequate, considering its scope. The book covers, however, much less ground than Mr. Barnett's work, and it is not so much concerned with synthetic dyestuffs as with such products as benzol, toluol, sulphate of ammonia, carbolic acid, creosote, pitch, etc.—in other words, with the primary products of the tar-distiller. It appeals to the business man and the student of commerce rather than to the chemical student or the technologist. Its author is the lecturer on coal-tar distillation at the Hull Technical College, and the book is evidently based upon considerable experience of the industry. It is well written and eminently readable, and merits the attention of the special class for which it is intended.

(3) This book is now in its fourth issue. It is a type of work which is becoming increasingly common, and of which practically every country which is concerned to any extent with chemistry and the chemical arts can furnish examples. They are mainly intended for the chemical analyst, works manager, and consultant, and are compiled on very much the same lines. They consist for the most part of tables, such as the chemical and physical constants of the elements, critical data of gases, gravimetric factors and their logarithms, molecular and atomic weights and their logarithms, and a collection of useful analytical factors, physical constants of inorganic and organic compounds, hydrometer tables, specific gravity tables, thermochemical data, tables of weights and measures, a list of definitions of fundamental units of weight and mass, etc. An unusual feature is a list of arithmetical problems illustrating methods of calculation occasionally needed in industry, with their answers. Certain of these are not original, and may be found in works dealing with chemical arithmetic. But the list is fairly representative, although it might be assumed that any user of the annual would have already familiarised himself with such calculations during his studentship. The compilation concludes with a list of the more important books interesting to the chemist which have been published since October, 1913, with their prices in American currency.

The value of a compilation of this kind depends wholly upon its accuracy, and it is evident that no pains have been spared to ensure this. The most trustworthy data have been selected, and the editors have had the assistance of a competent body of experts, who have dealt with special groups. Although the work is called an "annual," it should be noted that the several editions are not necessarily revised in each successive year. The first issue appeared in 1906, the second in 1909, the third in 1913, and the present issue is dated November, 1917. Considering, however, the nature of the subject-matter, it is reasonably certain that the book has been kept well up to date, and that it fully realises its aim as a convenient reference book of numerical data.

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